Emerging Environmental Issues and Institutional Responses in Korea**

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Contents

I. Definitional Scope of Environmental Issues

So many and diverse problems that affect the quality of life can be treated as "environmental" issues. In recent years it is even fashionable in the field of environment-related studies to be all-encompassing in conceptualizing ones subjects of inquiry. As an author claims, "under this broad definition of environment *all of the ills of man emerge as euvironmental problems*—poverty, prejudice, public education, health services, militarism, inner circles and pollution all qualify as environmental crisis."(1) Hence, the concept of "environment" no longer provides any objective criteria by which to circumscribe the appropriate boundary of the subject-matters of an inquiry. Confronted with such a conceptual ambiguity, the only sensible way of delimiting the scope of inquiry is to rely upon ones own judgment of practical relevance of the particular subject-matters or areas to be chosen.

Though a little risky and somewhat speculative, the total set of environmental issues

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(1) Fred Carvell and Max Tadlock, *It's Not Too Late*, Beverly Hills: The Glencoe Press, 1971, p. 5.

may be divided into sub-sets : namely, one of those which concern environmental degradation resulting from economic growth and industrialization and the other of those which can be considered as the attributes of poverty in pre-industrialization stage. The former are of the "effluents of affluence" and the latter are of the "pollution of under-development." Some typical examples of environmental problems that belong to the former are increasing amount of toxic emissions by industries, destruction of wildlife due to technological abuses, and other environmental disamenities resulting as consequences of rising level of material consumption, while such common attributes of under-development as an unsanitary water supply, grossly poor conditions of shelter, and inadequate transport facilities and so forth may be included in the latter.

It is admitted that, in actual situation of a country, it is risky as well as difficult to make a strict separation of the two different categories without having sufficient data on the nature and causes of environmental degradation in general. Furthermore, environment is indeed an "integrated whole which receives the impact of all the separate insults inflicted by pollutants"(2) and therefore, it may not be even meaningful to separate the two issues in reality.

Considering, however, the kinds of ameliorative measures that are taken to cope with the problems and also, the differences in ideological orientations that underlie the conditions and/or situations perceived as *problematique*, it is safe to say that there is a societal differentiation of the two sub-sets of environmental issues. Such a societal differentiation is especially manifest, and important to take notice of, in a developing country like Korea where national economic structural shift is occurring. The problems of the "effluents of affluence" are considered to be associated with the new structure of economy, while those as perceived to be the "attributes of under-development" are considered as concomitant with the old structure. Considered as such two different structural phenomena, it is generally believed that two different sets of norms are needed, one for the problems associated with the new structure and the other for those resulting from the old structure. That is to say, although the physical damages that are to be inflicted upon population by different environmental pollutants may be of the same nature, the ameliorative approaches must be different against affluence and poverty damages. Quoting an economic planner in the government, much of the environmental degradation that may be considered as resulting from under-development can be improved by more investments in social overhead costs,

(2) Barry Commoner, *Science and Survival*, New York: The Viking Press, 1966, p. 122.

while environmental degradaticon caused by the effluents of modern industries should be improved by application of stronger regulations of the effluents-discharging establishments. In other words, the basic tenet of improvement approach as against the -under-development damages is considered not particularly different from the conventional growth and investment strategies. But on the other hand, in order to cope with the affluence damages it is considered necessary to formulate a new set of norms that are specifically addressed to the "ill-effects" of growth and development.

In popular parlance the latter is usually called "public nuisance measures" (Gong Hae Dae Chaek) : and the definitional scope of environmental issues to be treated in this paper is drawn approximately around the bound of these "ill-effects" of growth and developement in recent years. If it is to discuss how effective specific measures are in terms of the total environmental quality of a particular region, it may be inappropriate to make such a distinction as to the causes of damages. However, since the objective of this study is to attempt a review and evaluation of the evolutionary process of regulatory principles and provisions of law applying to the environmental problems, it is considered necessary here to make the distinction as to the causal modes of environmental damages and thereby, draw the definitional scope as above.

II. Current Status of Environmental Quality

Envirnmental quality has been a much discussed political issue as well as policy in Korea since early 70's. Mass media and academic community were the forerunners in alarming and sensitizing the public to the encroaching dangers of environmental pollution. This was the time when Korea had successfully completed a decade of 15-20% annual GNP growth mainly by means of industrial development. New factories mushrooming in many parts of the country where hitherto no other productive activities than rice and/or barley growing had been known. People were swarming into larger urban centers such as Seoul and Pusan to look for their shares of develoment.

Although it had been indeed an unprecedented and so rapid a rate of growth, one decade of industrialization would not have caused so much problems of environmental degradation if not for the following contributing factors. First of all, it is the population density over the nation as a whole. As it stands now, the nation wide average population density is

of approximately 375 persons per square kilometer.[3] This is higher than that of Japan, which is approximately 300 persons per square kilometer. Depending on how one should measure the habitable land area, Republic of Korea is supposed to be either the most or the second most densely populated country in the world. Translated into enviornmental quality measures, such a high density means an immediate impact upon population of even a relatively small amount of environment-degrading pollutants.

The City of Seoul, for instance, contains as of this year 7.5 million population within a basin of approximately 680 square kilometer; and all of these 7.5 million people are drinking from and discharging into a relatively small river, the Han, of a little less than 6 billion cubic meters of water flow in normal times. It is not to say that the Han River is too small a source of drinking water for 7.5 million popuation.[4] But it is to point out that, since this is the only river that irrigates some 120,000 hectares of rice paddies, supplying industrial use water for some 40% of all the industrial establishments of the country and at the same time meeting the needs of the residential uses of 7.5 milion population, plus some 2 million more of the greater Seoul metropolitan region, even a slight pollution, which can so easily be done in such a congested situation, can compound the problems so much and for so many people.

Second contributing factor is the rapid rate of urbanization especially in the past two decades. Urbanization is not unique to Korea but more or less universal in the developing world. However, its rates and speed are different from country to country; and among the many urbanizing nations in the world, Repulbic of Korea marked the highest urban-rural growth differential for the period of 1950-1970 as is shown next in an IBRD report. Not only the rapid speed of urbanization but also the aggregate percentage increase of urban population has also been of a significant magnitude. In two decades since the end of Korean War in mid-'50's, the percentage share of urban population increased from 27% to 60% of the total population.[5] Relative to the total population increase, this is indeed a phenomenon appropriate to be called "hyper-urbanization." During this period a few

(3) The average population density of urban areas is about 9 times of the national average as of 1978; and Seoul's density is 12,000 square kilometer.

(4) A Smithsonian research team estimated in 1974 that "assuming that the greater part of Seoul's water continues to be taken from the Han River, it seems unlikely that needs cannot be met even at low flow." Peter H. Freeman, ed., *The Urban Environment of Seoul, Korea:A Case Study of the Impact of Rapid Urbanization*, Office of Int'l & Environmental Programs, Smithsonian Institution, Nov. 1974, p. 85.

(5) As of the end of 1976, it is 60.2% in official statistics. Ministry of Home Affairs, *Municipal Yearbook of Korea*, 1977.

Table 1. Pace of Urbanization between 1950 and 1970 for All Countries with a Population Greater than 15 Millions in 1950

	T. Population 1950 (Millions)	T. Population 1970 (Millions)	URGD 1950-1970
Africa			
Egypt	20.5	33.3	2.66
Ethiopia	17.7	24.8	5.50
Nigeria	34.3	46.1	2.60
South America			
Argentina	17.1	23.7	3.18
Brazil	52.0	95.2	3.89
Mexico	26.3	50.5	3.37
North America			
U.S.A.	152.3	204.9	2.37
Asia			
Bangladesh	40.0	68.2	1.79
Burma	18.3	27.7	3.03
China	540.3	771.8	3.79
India	359.2	548.4	1.11
Indonesia	76.0	120.0	2.32
Iran	16.6	28.4	2.59
Japan	82.9	104.3	3.61
Korea(N+S)	30.1	44.6	5.27
Korea N.	9.7	13.9	4.33
Korea S.	20.3	30.7	5.71
Pakistan	36.6	62.0	2.68
Philippines	20.3	38.4	1.38
Thailand	19.6	36.2	1.99
Turkey	20.8	35.6	4.11
Vietnam	24.6	33.2	2.65
Europe			
Fed. Rep. of Germany	47.8	60.7	2.13
France	41.7	50.7	3.72
German Dem. Rep.	18.4	17.0	.07
Italy	46.8	53.6	2.04
Poland	24.8	32.5	3.01
Rumania	16.3	20.2	3.47
Spain	27.9	33.8	2.89
United Kingdom	50.6	55.5	0.41
Yugoslavia	16.3	20.4	3.27

From, Bertrand Renaud, *Economic Structure, Growth and Urbanization in Korea*, (IBRD Working Paper), Sept. 1977, p. 5.

larger cities like Seoul have tripled or even quadrupled their population size.

Having stared from grossly insufficient base of urban infrastructures such as municipal

water and sewage facilities, transport systems and with pre-industrial land-use patterns, such a rapid and large scale urbanization trend allowed little time, nor sufficient space, to prepare for even a basic minimun order and amenities of settlement for the incoming population. Haphazard agglomerations and physical mix of population and industrial activities have practically unavoidable. This earlier patterns of settlement and agglomeration complicates the current environmental problems; and much of the basic urban infrastructures are now being planned and built in most of the cities.

The last but not the least important factor is the past practice of inadequate consideration of long-term environmental impacts in most of the locational decisions of new industrial establishments. It is only very recent that the government in issuing location permits of new factories began to have "consultations" with the environmental management agency, i.e., Ministry of Health and Social Affairs. Until around 1975, the main locational considerations had been of only such economic efficiency factors as accessibility to port facilities, water resources, land values, regional labor availability, and so forth. Since 1963 there has been a law (Comprehensive National Land Planning Law) in force for decentralization of industrial locations: but this law has been invoked primarily to promote industrial developments in under-developed regions and thus, no particular attempts were made to consider comprehensive environmental impacts of industrial locations. As a result, most of the new industrial establishments were located along the inland river basins, near harbour or estuaries along the South and West coast of the country.[6] This earlier pattern of industrial locations now aggravates the downstream river and coastal marine pollution problems by being compounded with the more traditional residential discharges of wastewater and nightsoil.

Because of these contributing factors the environmental problems have now become worse and more rapidly so: that is, worse relative to the current level of industrialization of the counrty. Contributed and compounded by these factors of nationwide settlement patterns and infrastructure systems, the current status of environmental problems of Korea as due to the "effluents of affluence" may be best illustrated by air and water quality measures.

(1) Air pollution

According to a recent survey[7] by the Korean Institute of Technology of Seoul citizens

(6) Ke Chung Kim & Chae-Shik Rho, ed., *Korean Environment and National Development*, The Korean Atomic Energy Research Institute (KAERI), 1975, p. 24.

(7) As reported in Chosun Ilbo (Chosun Daily News), Feb. 27, 1979.

perception of air pollution, 72% of the sample residents of Seoul surveyed responded that the Seoul air is now felt worse than 5 to 6 years ago. As it was measured by the city government in 1977 at 49 stations, about 6 stations showed 0.061 ppm reading of sulfur dioxide (SO_2) concentrations, which is higher than the permissible level of 0.05 ppm of both the Korean Environmental Preservation Law and of WHO standard. The national annual mean levels of SO_2 as measured by a private research institution[8] in 1977 covering a few selected cities were 0.068 ppm for industrial zones, 0.053 ppm for down-town commercial districts and 0.049 ppm for residential zones. The measurement technique of the latter national mean is a little dubious, especially in regard to its selection of measurement stations and timing. However, combined with above Seoul figures, there seems to be no denying that the Korean urban air pollution problems in terms of ambient SO_2 concentrations are getting to be serious.

There is not yet reliable data by which one could know the air quality of a city as a whole, let alone for the whole country, and throughout a year. And perhaps, "it is not as severe··· as would be expected··· partly owing to the relatively few vehicles," and "neither is the pollution as serious as some earlier data indicate, owing to their inaccuracies."[9] Nonetheless, by the data such as above though of random and ad hoc measurement, it is clear that there are very bad areas and perhaps, a few very bad days of the year.

Ambient SO_2 concentration in the air is a very obvious indicator of environmental pollution due to industrialization. Most of Korean industrial establishments and power plants are using Bunker-C oil which contains relatively higher percentage of sulfur. Many office buildings in down-town commercial districts of larger cities are also using Bunker-C oil for heating purposes. Besides, most of the buses, which are the the main modes of mass transportation in Korean cities, and heavy load trucks are burning diesel fuels which also contain about 2% sulfur. Rapidly increasing number of these modern industrial business establishments and means of transportation will be aggravating the air quality if not properly controlled soon. Not only Bunker-C and diesel oil but also gasoline burning is producing sulfur oxides. There is an estimation that between 1965 and 1974 the consumption of petroleum products such as gasoline, kerosene, diesel and oil had increased six times in quantity; and the total fuel consumption in 1980 would be at least five times that of

(8) Korea Industrial Management Research Institute, *Environment and Pollution* (Hwan Gyeong Gwa Gong Hae), Vol. 1, No. 6, 1978.

(9) Peter H. Freeman, ed., *The Urban Environment of Seoul, Korea*, op. cit., p. 114.

1965.[10] Currently there are about 200,000 automobiles in the city of Seoul;[11] and only about 8% of its homes are oil heated. The number of automobiles and oil heating houses will be rapidly inceasing in near future. If a very strong and determined measure is not going to be applied soon to these increasing use of petroleum to regulate the lead content and the effluents discharges, the ambient sulfur concentration in the Korean air will soon be very critical.

Table 2. Pollutants by Sources of Emission(1975)

Sources	Quantity (%)				
	SO_2	NO_x	CO	HC	Dustfall
Auto.	0.5	16.6	85.3	37.2	3.1
Factories	39.1	34.6	12.6	46.9	60.7
Power Plant	32.8	15.6	0.5	0.7	8.9
Houses	27.6	33.2	1.6	15.2	27.3

Source: Korea Industrial Management Research Institute.

Carbon monoxide (CO) concentrations in the air of densely populated urban areas is also a serious problem. No reliable data are available to know the more recent condition, but a survey in 1975[12] indicates that the CO concentrations for industrial and residential areas of Seoul were 6.7 ppm and 6.5 ppm respectively. These figures seem a bit too high, but they may be correct if taken during a winter day at very bad areas.

If the increasing quantity of SO2 concentration in the air of Korean cities is primarily a phenomenon to be classified as the efflunce of growth and industrialization, CO concentration is of a mixed problems of industrialization and of poverty. Carbon monoxide concentrations in Korean urban air are mainly from two sources, i.e., automobiles and residential burning of anthracite coals for heating and cooking. The negligible difference between above two figures of 6.7 ppm and 6.5 ppm of industrial and residential areas attests to it. More than 90% of Korean urban homes burn anthracite coal briquets for cooking and "Ondol" floor heating; and therefore, during the winter season residential areas are no better than down-town commercial districts or industrial zones as far as CO concentrations

(10) Ke Chung Kim & Chae-Shik Rho, ed., *Korean Environment and National Development*, op. cit., p. 13, & p. 33.

(11) According to a Smithsonian team's survey, "the average day's travel for an auto in Seoul is something over 200 Km. Hence, these vehicles travel an average on the order of 50,000 miles per year.... The average traffic volume is thus equivalent to some 10 times as many automobiles as were registered." Peter Ho Freeman, ed., op. cit., p. 129.

(12) Chae-shik Rho, *Urban Environmental Pollution* (Do Shi Hwan Gyeong O Yeom), 1975.

is concerned.

If it is true as some of the experts claim that carbon monoxides constitute half of the total air pollutants in Korean cities,[13] the most effective way to clear the air would be to find a less polluting substitute energy for Korean homes. In fact the government is trying very hard to increase the supply of liquefied petroleum gas for urban residential heating and cooking. But as Korea does not produce an inkling of oil and natural gas, depending entirely on imported petroleum, it is still a far cry to having even a half of the homes use other fuels than anthracite coal.

(2) Water Pollution

Water quality is also a serious problem and needs an immediate attention. Main sources of Korean water resources are four rivers, all of which flow from the origns in the eastern highlands into the Yellow Sea in the west. The normal flows of these four rivers are estimated to be about 24 billion tons and the usable surface water supply is approximately 11 billion tons.[14] There is not a reliable estimation available to know if this much of water resources is sufficient to meet the increasing needs of industrial, residential, agricultural and recreational uses.

However, as briefly mentioned earlier regarding the Han River flowing through Seoul metropolitan region, the river-basins of all of the four major rivers of Korea, especially downstreams, are heavily populated and being rapidly industrialized. An estimation in early '70's indicates that waste waters from residential areas and industial establishments into above four major rivers amounted to about 4 million tons a day and would probably reach about 10 million tons a day in early '80's.[15] Virtually all of these waste waters have been poured into the rivers without having been treated at all of the pollutant untill very recently. Hence it has rapidly become hazardous both for human health and marine life.

As for the Han River which is currently most polluted by over 10 million population and some 40% of Korean industries, approximately 1.6 million tons of waste water and sewage go into it.

It was surveyed in 1974 at two downstream intakes that its BOD level was 29 ppm and 31.2 ppm.[16] It was found that in downstream heavy metal concentrations such as cadmium

(13) Ke Chung Kim & Chae-shik Rho, *op. cit.*, p. 30.
(14) *Ibid.*, p. 26.
(15) *Ibid.*, p. 27.
(16) *Ibid.*, pp. 27-28.

Table 3. Water Quality of Selected Rivers (Mid-70's: Yearly Average in ppm)

River		D.O.
Tama, Tokyo	(1974)	5.4
Seine, Paris	(1974)	9.4
Rhine, Lobith	(1972)	4.7
Tame, London	(1973)	2.6
Rhine, Baraubach(Koblenz)	(1973)	4.7
Han, (Kwang-Jang Ri), Seoul	(1974.12-1975.8)	8.2
Han, (Ka-Yang Dong), Seoul	(1974.12-1975,8)	5.2

Source: OECD, *Environmental Policies in Japan*, Paris, 1977. Samsung Cultural Foundation, *Research Report*, Vol.9, 1976.

(0.00027 ppm) and copper (0.02 ppm) were also contained.

Of course the raw water is treated by means of settling, filtration and chlorination for drinking purposes; and by 1980 all of the downstream drinking water intakes will have been abandoned and Seoul's water intake station will be moved upstream to the Paldang Damsite where practically no industrial and residential waste water flows into. However, unless the immediate and comprehensive mesures are not going to be taken, the inland water as well as well as marine water quality of Korea will very rapidly deteriorate.

The water quality in Korea is also a mixed case of problems of industrialization and underdevelopment as that of CO concentrations in the air. Rapid industrialization has brought the increasing amount of heavy metal concentrations such as cadmium and mercury, while on the other hand the fast rate of population concentration in a few big cities where no modern infrastructures and facilities of sewage and of human excreta treatment is available is dumping the effluents of under-development right into rivers. Hence, the water quality will also require a tremendous amount of capital investements into new infrastructures construction as well as strong regulatory measures against industrial effluences.

Air and water pollutions are not the only problems of environmental degradation in contemporary Korea. Even to name only those that can obviously be classified as the problems resulting from industrialization and technological advances, chemical herbicides and pesticides concentrations in the agricultural soil, increasing urban residential densities and concomitant decrease of recreational outdoor spaces are some of the other impending environmental issues. Korea is not at all unique in experiencing all these problems. But as stated earlier, since its territorial space is so compact and densely populated, perhaps the problems are felt more acute and their impacts are more immediate. Indeed beginning late '60's and early '70's, complaints began to be heard against the rapidly deteriorating

environmental quality: and public awareness of the problems have been rapidly enhanced. The farmers and fishermen were the first ones to raise their voices and seek compensation. Then came in mid '70's urban intellectuals and middle class with their complaints of smogs and fumes in the city streets and with their suspicion of contamination of drinking water. This was around the time when Korea was pushing itself through the very ambitious Second Five Year Economic Development Plan (1967-1971) for heavy and chemical industries and was "taking off" on the course of an industrial society. But on the other hand it was also a time when resounding echos of worldwide environmental concern and of the problems of economic growth were being heard, especially from the already industrialized socities in the West. No doubt Korean urban middle class and intellectuals could not help hearing these worldwide echos.

III. Institutional Response

(1) The Public Nuisance Control Approach

Even before 1970's there was a law in Korea specifically to regulate the industrial pollution discharge. It was the Public Nuisance Prevention Law, which had been enacted in 1963 to "prevent injuries to public health, damages to living environment from air, water, noise pollution and vibration." This Law was basically to provide for the government authority to enforce emission standards at the sources of pollution. In order to enforce the emission standards the government was empowered to require the polluting industries and other sources to install and operate pollution prevention facilities ; and when individual polluters are found to emit pollutants exceeding the government prescribed standards and in violation of the legal requirements of pollution prevention facilities, the Minister of Health and Social Affairs could issue administrative orders to stop the operation of the polluting activities and/or revoke the license to operate the activities. And if further violations of the ministerial orders or legal requirements were to be found, criminal penalties of imprisonment and/or fines could also be imposed upon the polluters.

It must be noted here that 1963 was only one year after the beginning of implemention of the First Five Year Economic Development Plan ; and no serious problems of industrial pollution had been yet complained about or cited anywhere in the country. Compared to what it is today, the environment of Korea then, in so far as the natural environment was concerned, was of very high quality. What particular events or ideas had instigated the promulgation of this Law in 1963 is not clear. But in the light of the fact that in that

same year the Comprehensive National Land Development Planning Law[17] was also enacted, it may be that the law-makers then thought it necessary to have preventive measures against expected side-effects of industrialization in the future.

As the problems of environmental pollution was becoming more real and manifest in the late '60's and early '70's, the Public Nuisance Prevention Law came under severe criticisms from many quarters of environmentally conscious citizens organizations and experts. The main theme of the criticisms, until the Law was eventually replaced by the new Environment Preservation Law of 1977, were concerning two deficiencies: the first often cited deficiency of the Law was that it did not contain provisions for a comprehensive nationwide and/or area-wide environmental standards by which an integrating concept of environmental quality and an overall environmental policy of the government could be established.[18] It was indeed true that the old Public Nuisance Prevention Law had been designed mainly to control environmental polltuion by means of enforcement of the emission stadards at the source and at the plant boundary; and thus, there was no responsibility on the part of the government to monitor and check the environmental quality of a city or a region as a whole.

The second deficiency of the Law as often cited as the first one was related to the leniency of the penalities against violators, especially in regard to the amount of fines to be paid. It was the point of the critiques that the penalities were much cheaper than the private gains to be accrued to the polluters by polluting the public environment. In this regard the "polluters pay" principle was also pointed out as missing in the Law.

The Law has been almost inoperative since its inception. However, the real reason of its ineffectiveness was not so much of the obvious deficiencies in the written provisions as the problems in the enforcement process such as lack of money, manpower and technical know-how. For instance, even without having the comprehensive environmental standard for a city or a region, if strong and effective emission controls at the sources had been applied as provided in the Law, today's situation could have been much better. But without even having been able to take a systematic emission inventory of so many polluting

(17) This Law provides for balanced development of all regions of the country in regard to industrial locations and urban infrastructure investments.

(18) cf. Julian Gresser, "Balancing Industrial Development with Environmental Management in the Republic of Korea," (IBRD Working Paper), Dec. 1977; and Kim Chung-Hyun, "Recent Developments for Environmental Improvement in Korea," a paper presented at the Seminar on Enviromental Education sponsored by UNESCO Korea Commission, Jan. 1979, p. 6.

sources, [19] enforcement of the Law was never possible. And furthermore, it was only in 1967 that a separate section of pollution control administration was established at the Ministry of Health and Social Affairs which have the main responsiblilty to enforce the law.[20] Under such circumstances effectiveness of the Law can not possibly be evaluated only in reference to its statutory language.

At any rate, however, a new approach had to be taken by the government in the face of the mounting criticisms and controversies of existing environmental protection institutions. And so came the birth of the new Environmental Preservation Law of 1977 to replace the old Public Nuisance Prevention Law.

(2) Environment Preservation Law

As the problems were aggravating and the criticisms mounting against the existing institutions of regulations and remedies since mid '70's, the national government began to think about overhauling the existing system. The first significant outcome was the new Environment Preservation Law, which was proposed to the National Assembly in 1977 and eventually put in force beginning Jan. 1, 1978. This new Law substitutes the old Public Nuisance Prevention Law as of January 1, 1978[21]; and it covers much wider areas of environmental pollution in 70 articles, while the old Law had only 26 articles.

In contrast to the old Law's approach as criticized above, the new Law "seeks to provide a unifying concept for previously uncoordinated, piecemeal control measures."[22] The new Law provides for regulations of air, noise, vibration, water and soil pollution; and thus, it has added soil pollution which had not been covered by the old law. However the uniqueness of this new Law as compared to the old Public Nuisance Prevention Law is the "ommibus approach" that calls for "nationally promulgated ambient and discharge standards"[23] as well as city-wide or provincial environmental quality standards "when deemed necessary in view of the regional environmental conditions."[24]

Beside the nation-wide and region-wide environmental quality standards, the new Law attempts to strengthen the institutional framework of environmental quality control by

(19) Peter H. Freeman, ed., *The Urban Environment of Seoul, Korea, op. cit.*, p. 19.
(20) Chung-Hyun, Kim, *op. cit.*, p. 6.
(21) Along with the Environment Preservation Law, a new Marine Pollution Prevention Law was also enacted: until now marine pollution has not been covered by any law.
(22) Julian Gresser, *op. cit.*, p. 7.
(23) *Ibid.*, p. 8.
(24) Environment Preservation Law, Art. 4, para. 3, as translated into English by the Ministry of Health and Social Affairs.

means of the following new provisions. First, it requires the Minister of Health and Social Affairs to "establish monitoring network and to measure the level of environmental pollution regularly to identify the nationwide status of environmental pollution."(25) The same responsibility is also imposed upon the mayors and governors of cities and provinces. How effective this monitoring requirement will depend very much upon the availability of technical manpower and facilities to measure the pollutions. Yet it is significant at least as the recognition of the needs of base-line data on the ever-changing status of environmental quality.

Another innovative feature of the Law is the statutory requirement of "prior consultation" with the Minister of Health and Social Affairs on the environmental impacts of" a plan for urban development, development of industrial site, and energy resources development" to be undertaken by other government agencies.(26) The administrative by-laws to put this provision in actual operation are now in the process of formulation; and it is being formulated very similar to the U.S. Environmental Impact Statement filing procedure.

The "polluters pay" principle is also adopted by the new Law. In the statutory terminology it is called a "cost-sharing" scheme. But in effect it is to adopt the so-called "emission charge" system. That is, if a private project entails public investements to prevent its enviromental pollution, the costs are to be shared between the public coffer and the "project sponsor," or be wholly born by the "project sponsor" alone, depending on the natures of the polluting activities.(27) And this emission levy can be compulsorily collected according to the national tax collection procedures.

In regard to private disputes concerning pollution damages,(28) the new Law establishes a mediation procedure which was not found in the old Law. This is to establish quasi-judicial administrative tribunal both at the local government and national government levels in order to provide easier access to compensatory remedies for pollution damages. The settlement in this mediation procedure is provided by the Law as having the equivalent legal effect as that of the judicial procedure. Further discussion of this aspect of the Law will be attempted later in this paper, but this provision has so far been most effectively put into use.

(25) *Ibid.*, Art. 6, para. 1, 2.
(26) *Ibid.*, Art. 5.
(27) Art. 43-45.
(28) Art. 53-60.

In order to make the comprehensive area-wide environmental quality control operationally more effective, Article 7 of the new Law provides for a "special measures zone". That is, "the Minister of Health and Social Affairs may designate an area where environmental pollution is, or is likely to become, critical due to population and industrial concentration as the special measures zone for prevention of environmental pollution, and therereby, direct the mayor or governor having jurisdiction over the designated area to formulate and implement comprehensive environmental quality control measures." When this designation is imposed upon an area, the Minister of Health and Social Affairs may even intervene in the local government's land use and other public works planning process so as to prevent adverse environmental impacts. Within a year since the implementation of the Environment Preservation Law, this provision has not yet been invoked. However, if and when the national government wishes indeed to put the idea of area-wide comprehensive environmental quality control into practice, this provision will be of more practicable value than that for the establishment of national and/or regional environmental quality standards. This provision will enable the Ministry of Health and Social Affairs to supervise the designated local government in most of its land use and infrastructures planning process specifically to consider the environmental impacts. In considering the environmental impacts of local governments activities, inter-agency coordination has always been the most thorniest problem; and the new Law is expected to help solve this problem in favor of environmental considerations.

Beside these changes in substantive provisions, the amount of penalties against various acts of violations of the law have also been increased to a substantial degree. For instance, the maximum penalty of imprisonment has increased to 3 years from the 2 year & term in the old Law; and the maximum amount of fines has also increased to more than seven times of the old Law. Even this much increase of penalty may not suffice to offset the private gains of polluters as the critique of the old Law had been worrying about. Nonetheless, it must be admitted as rather a steep increase compared to the old system.

In addition to these major innovations, there are some more new features of the law to tighten up the institutional framework of environmental protection. But suffice it here to outline the major features as above contrasting with the old Law.

IV. Operational Effectiveness of the Law

(1) Administrative-Technical Constraints

Since mid '70's the national government has shown an increasing awareness of the necessity to prevent and control industrial pollutions. Effectivess of the control as well as preventive measures, however, depends very much on the availlablility of technical know-how, manpower and financial resources of the regulatory agencies. Especially as provided by the new Environment Preservation Law, if the national or the regional pollution monitoring network is to be effectively operated, rather sophisticated technical facilities and trained manpower are required at every local government. In reality, however, all of above three basic administrative resources are very much in short supply.

Only in 1977 the Ministry of Health and Social Affairs established a bureau level environmental quality control division under the Minister; and the bureau at present has only 20 full-time staff including administrative and technical personnel to cover the whole country. At the City of Seoul and at each provincial government, there is either a section of envirnmental management or of public hygene in which a sub-section of public nuisance is established.[29] But at the local government level the quality as well as quantity of manpower is yet to be improved a great deal. In 1978 a new National Environment Research Institute was established by the Ministry of Health and Social Affairs to help the Ministry and the local governments in technical matters. But this Institute is still a young organization, having only about 45 staff members for admimistration and technical work.

The national government's budgetary allocations for the environmental pollution control administration has been steadily increasing since 1974, especially since 1975.

Table 4: Annual National Gov't Budget for Pollution Control (in approx. $)

1974	1975	1976	1977	1978	1979
360,000	2.2 mill.	2.5 mill.	4.5 mill.	5 mill.	10 mill.

Source: Ministry of Health & Social Affairs

Yet it is still only about 10 million dollars; and this is indeed but a meager sum relative to the costs and investments needed to cope with the problems.

The total number of individual emission sources such as manufacturing factories and

(29) Chung-Hyun, Kim, *op. cit.*, pp. 4-5.

power plants that are registered at local governments so as to comply with the legal requirement of emission standards are approximately 16,000 as of 1978.[30] Approximately 4,000 of the total were reported to be currently discharging pollutants beyond the limit of legal standards; and the Ministry of Health & Social Affairs required them to apply for the Ministry's permit of their installations of pollution prevention facilities. However, till the end of 1978 only about 40% of them have complied with the Ministerial order and the Ministry has not been able to do anything but waiting for them to comply.[31]

One rather difficult problem in enforcing the pollution discharge standards against individual business establishments is the economic fragility of small and medium industries. That is to say, in spite of the fact that the small and medium industries make up a big proportion of polluting industries, especially in congested urban centers of Korea, they have not sufficient financial resources to install pollution prevention facilities as required by the law and the government can not do very much to help them comply with the law. Recently a revision has been made to the national tax law to allow 3 years exemption of income and corporate tax for the industries which produce and/or manufacture pollution prevention facilities and machines; and import tax reduction of 80% for the import of pollution prevention machines and/or facilities. These tax incentives might help the economic hardships of the many small and medium industries, but it is yet early to say how it will help.

One of the most effective measures so far undertaken against polluting industries has been the factory relocation program. This is to relocate the polluting sources out of congested urban centers either by the compulsory order as provided in the Environment Preservation Law or by application of administrative guidance with economic inducement such as tax reduction. The Ministry of Health & Social Affairs alone has issued orders of relocation to 286 factories so far[32], and more have been relocated by many local governments including the City of Seoul. The relocation program is of course contingent upon the availability of sites and other services in the areas where the industries are to be relocated to. Yet this program has been received very well by the society in general as a measure to kill two birds by a stone, namely, to get rid of the pollution sources as well as to lessen urban congestion.

(2) Judicial Attitudes and Private Remedies

(30) *Ibid.*, pp. 8-9

(31) As reported in the Seoul Kyong Jae Shinmun (The Seoul Economic News), Jan. 10, 1979.

(32) Chung-Hyun, Kim *op. cit.*, p. 10.

Until 1973 the Korean Supreme Court had been rather strict in allowing damage compensations in public nuisance litigations. The Court in principle had adopted a strict interpretation of tort laws in reviewing the lower courts decisions on the damage claims in industrial pollution cases.

To begin with, there were not many of such cases appealed to the Supreme Court in early '70's. But in one case in 1973 in which the plaintiff claimed damages to his ginseng farm by toxic elements discharged from a nearby chemical factory, the Supreme Court overruled the lower court's ruling that the burden of proof on the plaintiff of causality between the damages and the tortious act in such an industrial pollution case should be relaxed to the degree of proving only its probability and on the other hand, that the defendant should prove the contrary to exempt himself from the liability. In sending the case back to the lower court upon appeal by defendant, the Supreme Court ruled on the question of law that "as a matter of principle the burden of proof of causality between the damages caused and the tortious act in the case of damage claims due to tort rests with the claimant, i.e., the plaintiff, and therefore, that there is no reason to change the principle in the so-called public nuisance case such as the present one."(33)

In this case the lower court had followed more or less what was then called in Japan as the "theory of indirect proof".(34) That is, the plaintiff's burden of proof is merely to show circumstantial evidences by which to reasonably assume the causal linkage between the damages and the tortious act; while it is the defendant's responsibility to disprove the causal linkage to exempt himself from the tort liability. In proposing this new rule of burden of proof in industrial pollution case, the Court of Appeals of Seoul District said in essence the following: first, in indstrial pollution cases it is technically difficult as well as costly to get the defendant's cooperation for the plaintiff to make thorough investigation of the causes; second, it is scientifically difficult to make an ex post facto investigation of the causality between the damages and the polluting act and furthermore, there is not sufficient data collected by the public agencies on which the defendant could rely; third, improvement of pollution investigation technology is not catching up with the development of pollution-discharging production technology; and finally, it is the social responsibility of the defendant to prove harmlessness of the discharges in so far as his factory is discharging chemical substances. And therefore, that the plaintiff's burden of proof should be but to

(33) Supreme Court 2nd Division, 73 Da 919, Nov. 27, 1973.

(34) cf. Tomohei Taniguchi, "A Commentary on the Legal Theory of Major Pollution Cases," *Law in Japan*, Japanese American Society for Legal Studies, Vol. 9, 1976, p. 51.

prove the probability of causality.[35]

Come 1974, however, the Supreme Court changed its position to accept in essence the so-called probability theory. In a case involving the Korea Electric Corporation as the polluter-defendant, the Court reasoned that, "it is a general trend now to rely upon the so-called theory of probability in the damage suits due to public nuisance···that in cases of tort due to public nuisance it suffices to establish reasonble possibility of causality between the damages and the tortious act, while the defendant should prove the contrary··· since in the court of law the proof of causality in the tort cases is not of the scientific nature but of the court's conviction and at the same time, since the court's conviction is of the same nature as that of ordinary man's reasonable belief,"[36] if the theory of probability is to mean such proof of causality, the Court could accept it as the rule of evidence.

As in other tort cases, negligence on the part of defendant-polluter has to be proven. Yet the Supreme Court has been relatively less strict in regard to the negligence proof. In a case involving a chemical fertilizer company sued for damaging an apple farm by toxic chemical discharges, the Court ruled that the plaintiff's proof of negligence on the part of defendant was sufficient by showing that the defendant company had not installed sufficient pollution preventive facilities and also, that the employees of the defendant company were not qualified of technical know-hows to prevent the pollution.[37] In a later case involving the same fertilizer company, the supreme court also rejected the defendant's rebuttal that since the defendant company had taken all possible measures in modern technology to prevent pollution discharges, there should be no negligence attributed to the defendant.[38]

As shown in these series of cases since 1973, the awareness of Korean courts have constantly been increased of the predicaments of individual victims of "so many different kinds of pollution substances of large-scale industrial establishments".[39] Perhaps the most recent culmination of such an awareness was the Supreme Court Sponsored seminar on "Environment and Court Decisions" on November 15-17, 1978, in which some 40 senior judges participated to discuss the more effective judicial procedures of pollution-related litigation. In this seminar some of the judges proposed a new legislation that could allow

(35) Supreme Court Decision, supra.
(36) Supreme Court 3rd Division, 72 Da 1774, Dec. 10, 1974.
(37) Supreme Court 2nd Division, 71 Da 2016, May 22, 1973.
(38) Supreme Court 2nd Division, 73 Da 1253, Oct. 10, 1973.
(39) Supreme Court 3rd Divdision, 72 Da 1774, Dec. 10, 1974.

"class actions" for pollution damage suits and also, a legislative revision to provide for "taxpayers·suit" in administrative litigation to attain the court's mandanus to order the executive agencies to take affirmative action against polluting industries. Besides, the so-called probability principle as upheld above by the Supreme Court in the proof of causality was widely endorsed and also, argued to be further expanded in its actual application.(40)

All these recent developements in judicial attitude vis-a-vis industrial pollution litigations are very encouraging in view of the increasing instances of pollution damages. However, the root of the problem for many of the victims is still the cost and the time-consuming legal litigation procedures. Therefore, as aptly pointed out by a judge in above seminar, there is a need of less costly and more efficient means of remedies through administrative process. For this purpose a very significant step has recently been taken of the mediation proceeding as provided by the new Enviroment Preservation Law.

In September last year, 51 industrial plantowners in the City of Ulsan, which is the largest industrial complex in Korea, organized "Ulsan Region Environmental Preservation Coordination Committee" under the administrative guidance of the Ministry of Health and Social Affairs. And as their first concerted action to compensate the damages of the neighboring farmers, the Committee reached an agreement with the representatives of some 600 farm-households to pay approximately $ 600,000 for the total pollution damages the causes of which could not have been able to be identified separately to specific factories.(41) The compensationshare of each company was mediated and apportioned by the responsible government agency with the help of technical assessment of the Korean Institute of Science and Technology. And according to the Ministry of Health and Social Affairs, this was a test of the mediation procedures as provided in the new Law that would be applied to more cases in other areas in future. If this procedure is indeed going to be applied to wider areas and to more cases, along with the rapidly changing judicial attitudes, private remedies of industrial pollution damages will have much better opportunities in near future.

V. CONCLUSION

In a society where the environmental issues are still very much of interactive impacts of problems of under-development and effluence of growth, regulatory measures by means

(40) reported in Dong-A Ilbo (The Dong-A Daily News), Nov. 16, 1978.
(41) reported in Dong-A Ilbo, Jan. 11, 1979.

of law alone do not suffice. More investments in building infrastructures and other physical amenities, wise administrative guidance of industrial developments and effective political leadership in encouraging citizens participation are as much needed as enactment of new law in improving the quality of environment. Compared to such a complexity and magnitude of the problems, our discussion here has dwelt within a rather narrowly defined boundary.

However, by reviewing the more recent process of institutionalization of the public response to the newly emerging issues of industrial pollutions, we are able to have a glimpse of the dynamism of legal development in an industrializing society. Controlling industrial pollutions by means of law requires such a complex system of legislative-judicial skills, administrative resources, technical know-hows and financial resources. And therefore, this is an area where we can observe the most revealing processes of modernization of legal institutions.

As we look back upon the recent history of the legal development in this field, the single most decisive factor in Korea that have expedited as well as instigated the process is the public awareness of the problems. A survey conducted by a civic organization in 1976 questioning 4,370 sample population all over the country indicated that 68% of the sample responded positively to "I understand very well the meaning of environmental pollution;" and 55% responded that the current environmental pollution was "serious."[42] As much as the problems are aggravating, the public awareness is increasing and expanding as indicated in the more recent survey of 1978 quoted earlier. No doubt this increasing public awareness has been working as a mounting pressure upon the legislators, policy-makers and legal profession, eventually to help change the attitudes of the courts. Seen in the light of such an interplay between public awareness and legislative-judicial process, the future of legal institutions in this field is by no means pessimistic.

One big obstacle, however, at present is the lack of technical know-hows and hardware facilities to be used and installed at so many pollution sources. In order to overcome this obstacle both a tremendous amount of money and training will be required; and this may delay the more effective pollution abatement for quite a few years to come. A stronger enforcement of laws by the government may be endorsed to expedite the private sector's compliance with the legal requirements. But as mentioned earlier, special hardships on the part of the small and medium industries which make up the bulk of polluting industries

(42) Korean Environmental Protection Association, *Research Report*, No. 1, 1976, pp. 19-20.

today in Korea can not completely be disregarded. In this connection not only financial resources but also training of manpower in pollution abatement technology for so many different industries has a long way to go.

And one last but not the least important problem at issue is the institutionalization of community planning process so as to take proper consideration of the environmental impacts of various development programs. At present, thanks to increasing personal concerns of the individual members of various community planning councils, some considerations of environmental impacts are informally input in the decision-making processes. But formal institutional framework has not yet been established except in the form of consultations among related government agencies as provided in the Environment Preservation Law. A proposal to adopt a system similar to the Environmental Impacts Statement of the United States is being reviewed by the government. However, no one yet appears to be sure of the system that would be effective and feasible in the Korean context. The institutional response in formulating this system will be another very important test for the Korean society of how far indeed it would be willing to go in coping with the contemporary environmental problems.